S.B. JAIN INSTITUTE OF TECHNOLOGY MANAGEMENT & RESEARCH, NAGPUR

Practical 1
Prelab

Aim: Installation of Linux Operating System.

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❖ **Aim:** Installation of Linux Operating System.

❖ **Objectives:**

1. Understand the system requirements and compatibility for Linux OS installation.
2. Learn the step-by-step process to install and configure a Linux distribution.
3. Verify the installation and explore basic Linux commands for system setup.

❖ **Requirements:**

1. A bootable USB drive or DVD with the desired Linux distribution (e.g., Ubuntu, Fedora, Debian).
2. A computer system with minimum hardware requirements: 2 GB RAM, 20 GB free disk space, and a compatible processor.
3. Internet connection (optional, for updates during installation).
4. Software for creating a bootable USB, like Rufus or Etcher (if needed).
5. Basic knowledge of BIOS/UEFI settings for boot sequence configuration.

*****IN THIS PRACTICAL WE'LL BE INSTALLING <ins>UBUNTU</ins>*****

☐ **Prerequisite:**

Linux is an open-source operating system widely used for personal, professional, and server environments. Its flexibility, security, and community-driven development make it a popular choice for users. The installation of a Linux OS involves creating a bootable medium, setting up the system to boot from the medium, and following the installation wizard to partition the disk and configure system settings. Common distributions like Ubuntu, Fedora, and Debian offer user-friendly interfaces for easy installation. The process may include creating swap space, selecting a file system like ext4, and setting up user accounts. Post-installation tasks involve updating the system, installing necessary drivers, and customizing the environment. Understanding the installation process ensures better control over system performance and resource allocation, making Linux a powerful tool for both beginners and advanced users.

Steps to Make a Pendrive Bootable Using Rufus:

1. **Download and Open Rufus**: Download Rufus from its official website, install it, and launch the application.
2. **Insert Pendrive and Select ISO**: Connect the USB pendrive to your system. In Rufus, select your pendrive under "Device" and click "SELECT" to choose the Linux ISO file.
3. **Set Partition Scheme and File System**: Choose "GPT" for UEFI or "MBR" for BIOS under "Partition scheme," and ensure the file system is set to "FAT32."

4. **Start the Process**: Click "START," confirm the warning about data deletion, and wait for Rufus to create the bootable USB. Once done, eject the pendrive safely.

❖ Theory :

An **Operating System (OS)** is a core system software that acts as an interface between computer hardware and the user. It controls and coordinates the use of hardware resources while providing a stable and efficient environment for running application programs. The operating system is essential for the proper functioning of a computer system, enabling users to perform tasks conveniently and securely.

Functions of an Operating System

1. **Process Management**
   The operating system manages all processes running on the system. It handles process creation, scheduling, execution, synchronization, and termination. By efficiently allocating CPU time, the OS ensures smooth multitasking and optimal system performance.
2. **Memory Management**
   Memory management involves allocating and deallocating memory space to programs as needed. The OS keeps track of memory usage, ensures that processes do not interfere with each other, and supports techniques such as virtual memory for efficient utilization of RAM.
3. **File System Management**
   The operating system manages files and directories on storage devices. It provides functions to create, read, write, update, and delete files, while also maintaining file permissions and data integrity.
4. **Device Management**
   The OS controls and coordinates communication between hardware devices and the system using device drivers. It manages input/output operations for devices such as keyboards, mice, printers, monitors, and disk drives.
5. **Security and Protection**
   Security is a critical function of modern operating systems. The OS protects system resources and user data by implementing authentication, authorization, encryption, and access control mechanisms to prevent unauthorized access.
6. **User Interface Management**
   The operating system provides user interfaces such as **Command Line Interface (CLI)** and **Graphical User Interface (GUI)**, allowing users to interact with the system effectively.

Types of Operating Systems

1. **Batch Operating System**
   Executes a group of jobs in batches without user interaction. It is mainly used in large-scale data processing environments.
2. **Time-Sharing Operating System**
   Allows multiple users to access the system simultaneously by dividing CPU time among them, ensuring quick response times.

3. **Distributed Operating System**
   Operates on multiple interconnected computers and manages them as a single system, improving reliability and resource sharing.
4. **Real-Time Operating System (RTOS)**
   Designed for applications where timely and predictable responses are critical, such as robotics, medical systems, and industrial automation.
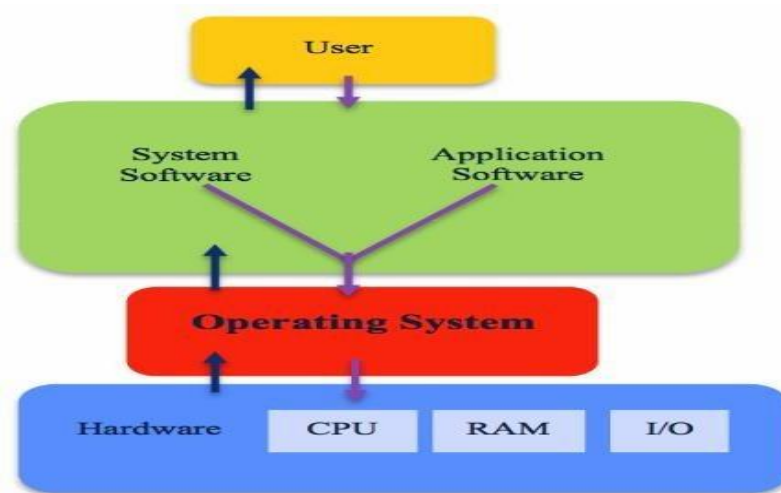5. **Mobile Operating System**
   Specifically developed for mobile devices, providing features like touch interfaces, power management, and wireless connectivity (e.g., Android and iOS).

Examples of Operating Systems

Popular operating systems include **Windows, Linux, and macOS**.

- **Windows** is widely used for personal and professional computing due to its ease of use and extensive software support.
- **Linux** is an open-source operating system known for security, flexibility, and use in servers and embedded systems.
- **macOS** is recognized for its stability, performance, and seamless integration with Apple hardware.

❖ Steps to Install Linux Operating System:

1. **Prepare Bootable Media**: Use a tool like Rufus to create a bootable USB drive or DVD with the Linux distribution ISO.
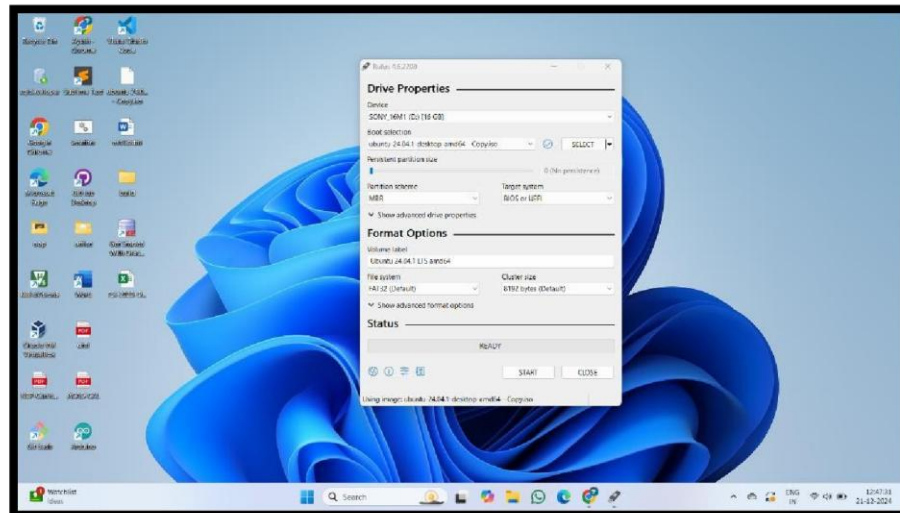

2. **Configure BIOS/UEFI Settings**: Restart your computer and access the BIOS/UEFI settings (usually by pressing a key like F2, F10, or DEL during boot). Set the boot priority to USB or DVD.

3. **Boot from Media**: Insert the bootable USB or DVD and restart the computer. The system will boot into the Linux installer.
4. **Choose Installation Option**: Select "Install Linux" or a similar option from the menu. Some distributions may allow you to try the OS before installation.
5. **Partition the Disk**:
   o Select the partition scheme (automatic or manual).
   o Create required partitions (e.g., root /, swap, and optionally /home).
6. **Set Up User Details**: Enter your username, password, and system name.
7. **Select Time Zone**: Choose your location to configure the correct time and date settings.
8. **Begin Installation**: Review the settings and click "Install." The process will take a few minutes to complete.
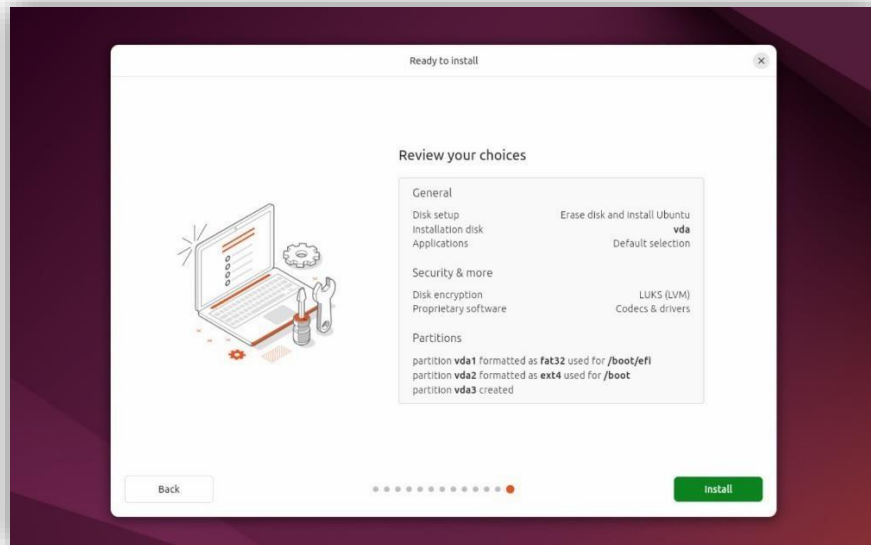
9. **Remove Bootable Media**: Once installation is finished, remove the USB or DVD when prompted and restart the system.
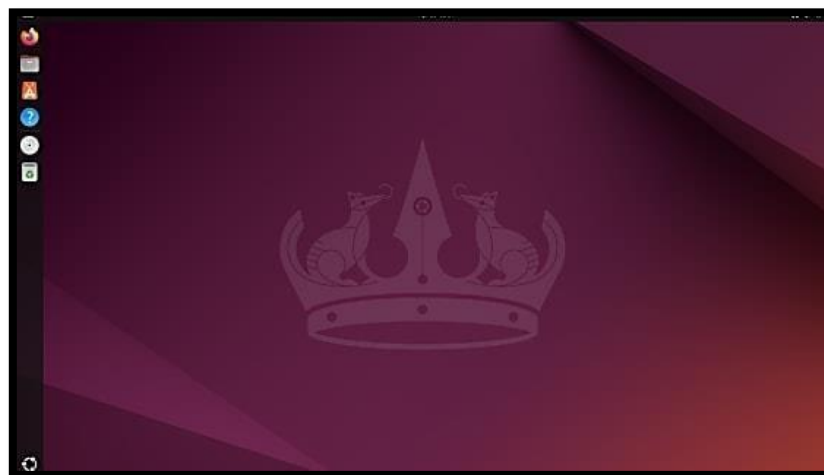
10. **Post-Installation Configuration**: Log in to your new Linux system, update packages, and install additional software if needed.

Commands to update:

Command	Use
sudo apt update	Fetches the latest information about available packages and versions.
sudo apt upgrade	Installs the latest versions of all currently installed packages.
sudo apt full-upgrade	Upgrades packages, adding or removing dependencies as required.
sudo apt autoremove	Removes unnecessary packages no longer needed as dependencies.
sudo reboot	Restarts the system to apply critical updates if required.

❖ **Conclusion:** The installation of the Linux operating system provides a hands-on understanding of system setup and configuration. It enables efficient utilization of resources and customization to suit user needs. Mastering this process builds a solid foundation for exploring advanced system administration tasks.

❖ **References**:

https://ubuntu.com/tutorials/install-ubuntu-desktop#1-overview **https://youtu.be/wjbbl0TTMeo?si=32l6h8VbcmU-euD** **https://answers.microsoft.com/ https://rufus.ie/en/**

☐ **Discussion Questions:**

1. **What is an operating system, and why is it important?**
2. **What is the purpose of creating a bootable USB, and how is it done?**
3. **Can you explain the difference between apt update and apt upgrade in Ubuntu?**
4. **Why is partitioning necessary during OS installation, and what are the common partitions used?**
5. **What steps should you follow after successfully installing a Linux OS?**

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